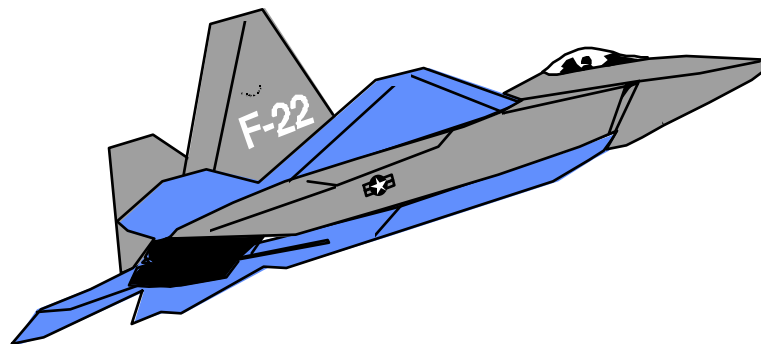
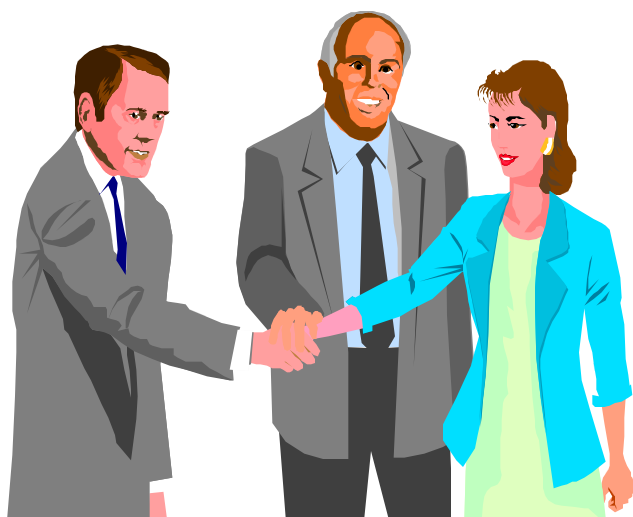




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F-22 Integrated Product Teaming



Presented to: DSMC Joint USAF - Industry Training

Jon Ogg
Chief Engineer
F-22 System Program Office

7 Dec 95

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Overview

- The IPD/IPT Philosophy
- Organizational Changes
- Integrated Management Structure
- Implementation Tools and Metrics
- F-22 Lessons Learned
- Summary

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What is IPD / IPT?

- ***“Integrated product development is a philosophy that systematically employs a teaming of functional disciplines to integrate and concurrently apply all necessary processes to produce an effective and efficient product that satisfies customer’s needs.”***

Air Force Material Command
IPD Guide, 25 May 93

- **The right people with the right expertise, tools, and dedication constitute the integrated product team**
 - **Common focus and trust are essential for team to succeed**

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The Bottom Line is ...

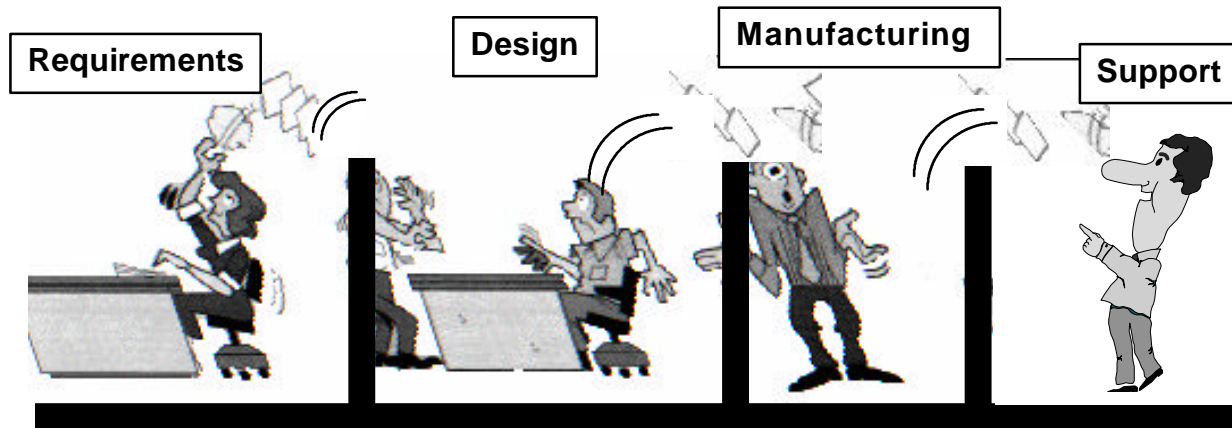
IPD is not about
changing *WHAT* you do

Its about changing
HOW you do it !

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“Over the Transom” Method Is Out

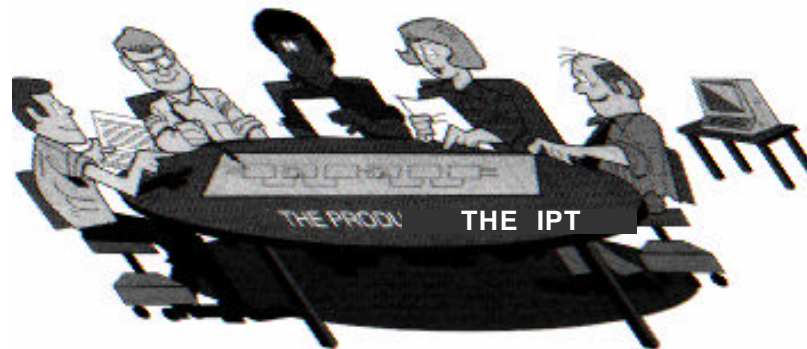
Old
Way



Over
the
Transom

F-22
Way

- All functions are involved
- From “cradle to grave”



Multidiscipline
Product
Teams

The IPT Way

Interactive Input

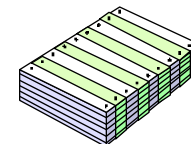
- Engineering
- Manufacturing
- Material
- QA
- Safety
- Security
- Support
- Computer Resources



Engineering and Manufacturing Development Life Cycle

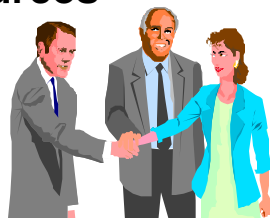
Build to Package

- Product Specifications (Hdw & S/W)
- Tool Design
- Support Equipment
- Test Packages
- Shop Orders



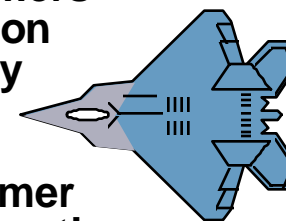
Focused Team Effort

- Understanding Requirements
- Product/Performance
- Manufacturing Resources
- Variability Reduction
- Cost/Schedule
- Technology
- Quality
- Maintainability
- Supportability



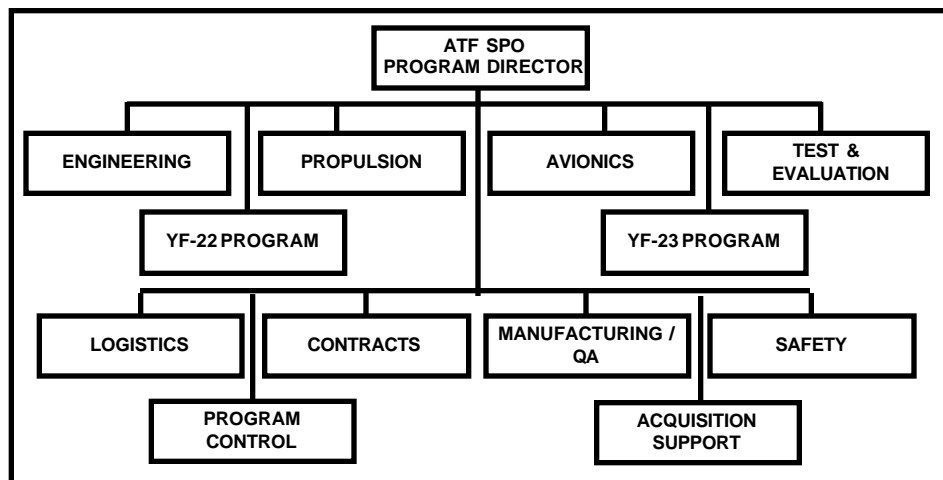
Deliver Products

- Internal Customers
 - Fabrication
 - Assembly
 - Flight
- Product Customer
 - Field Operations
 - Technical Support

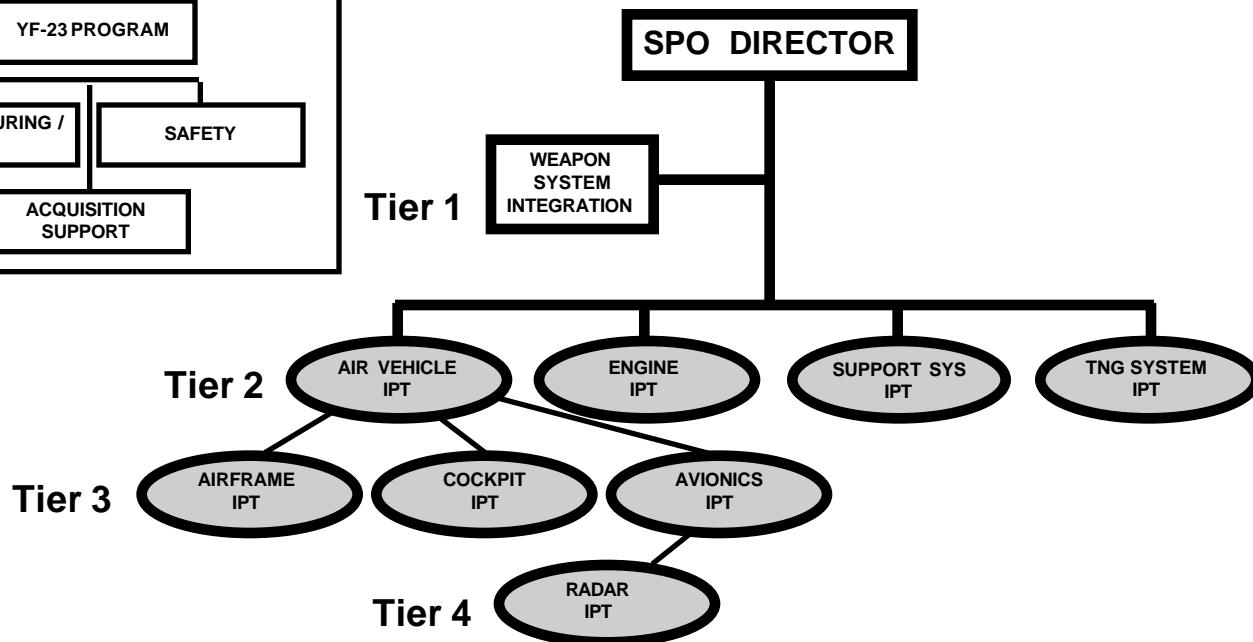


The SPO Made Organizational Changes

From a Functional Oriented SPO



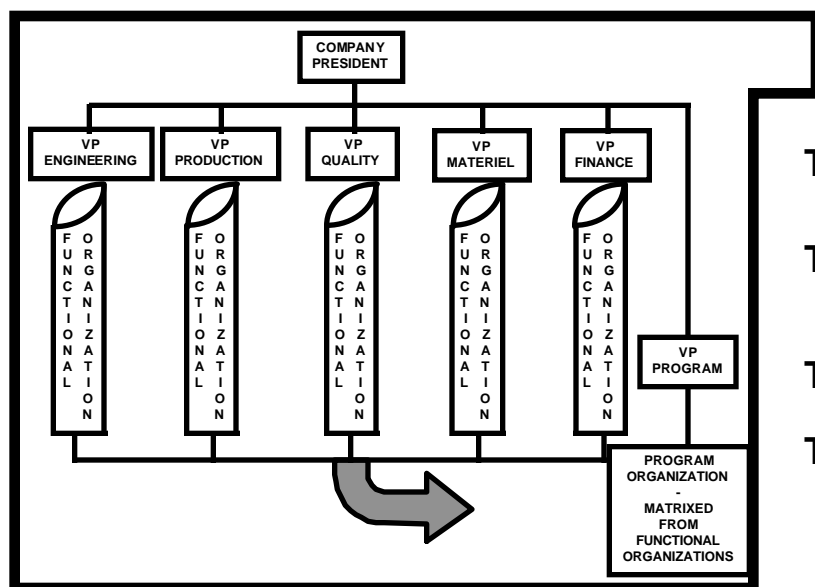
To a Product Oriented SPO



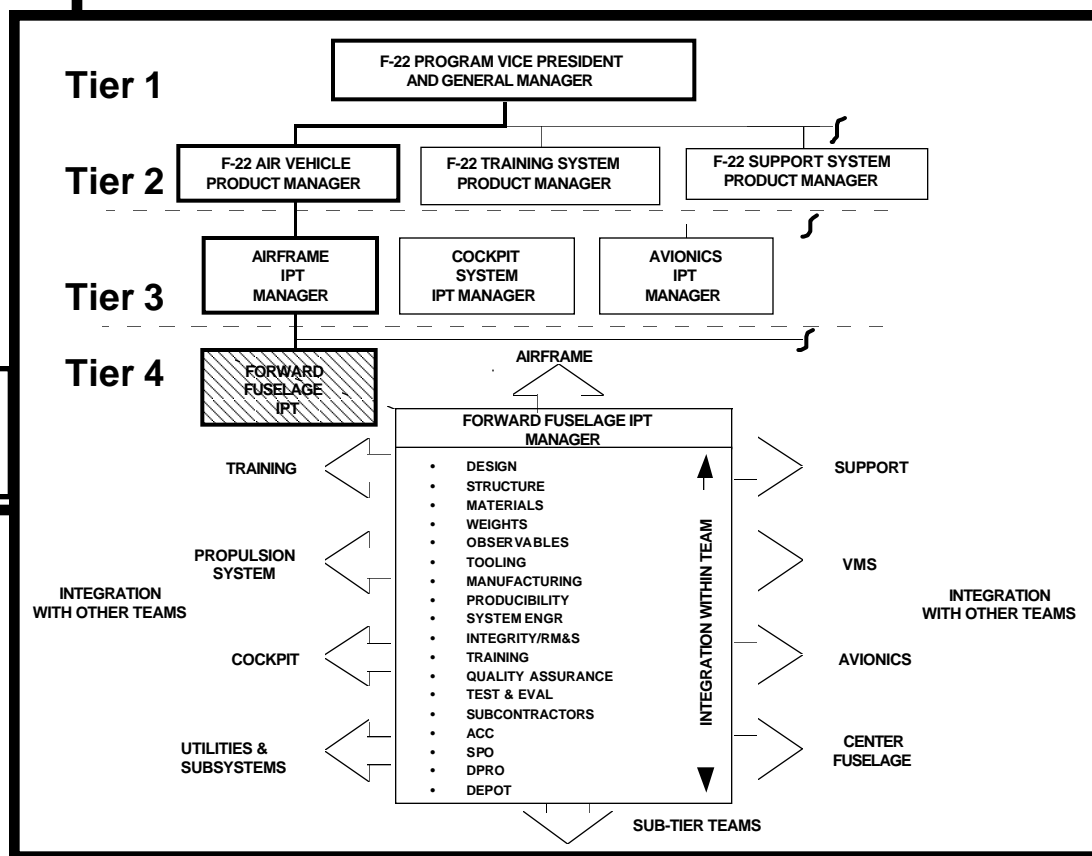


... And So Did the Contractors

From Functional “Stove Pipes”



To Integrated Product Teams

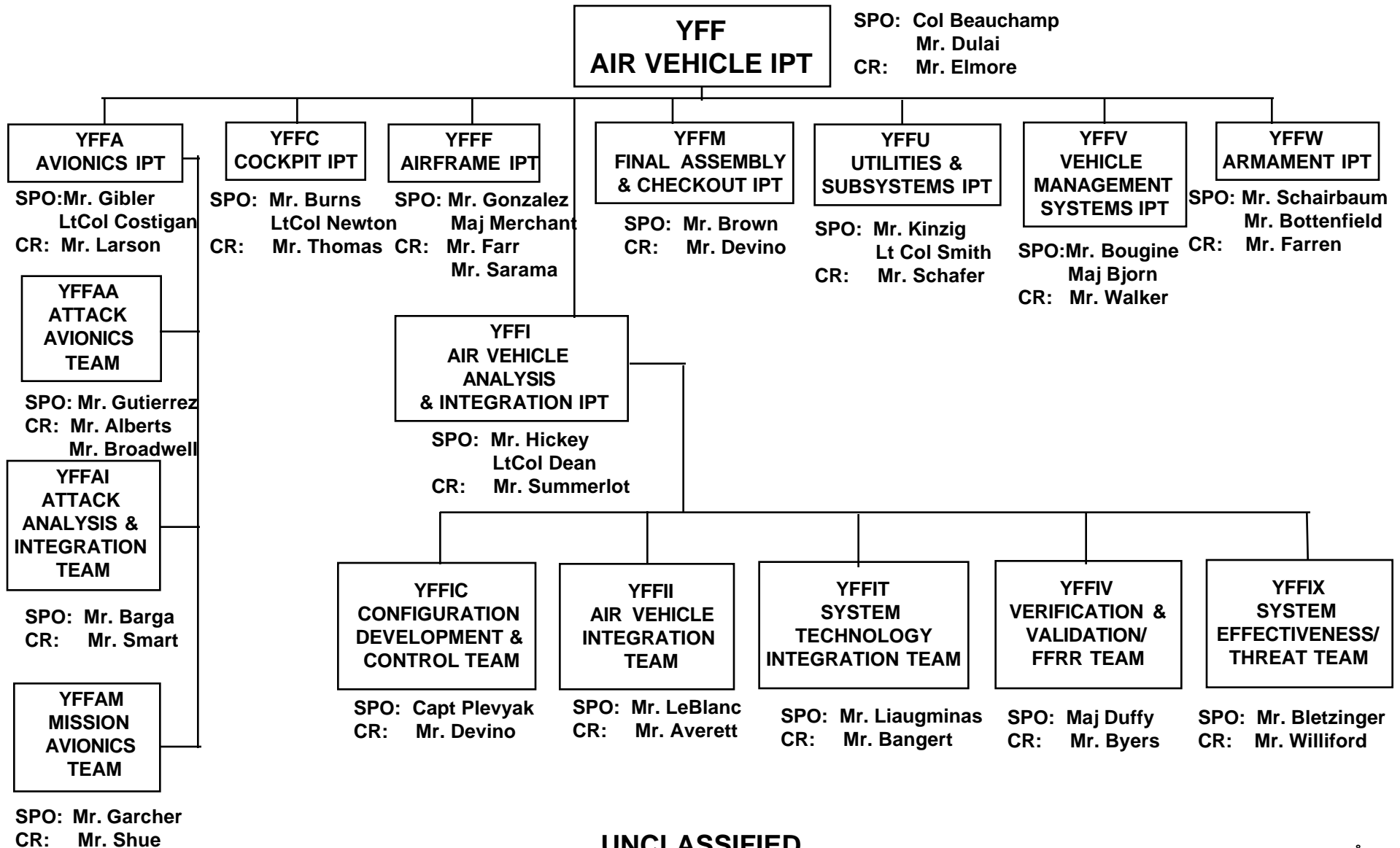




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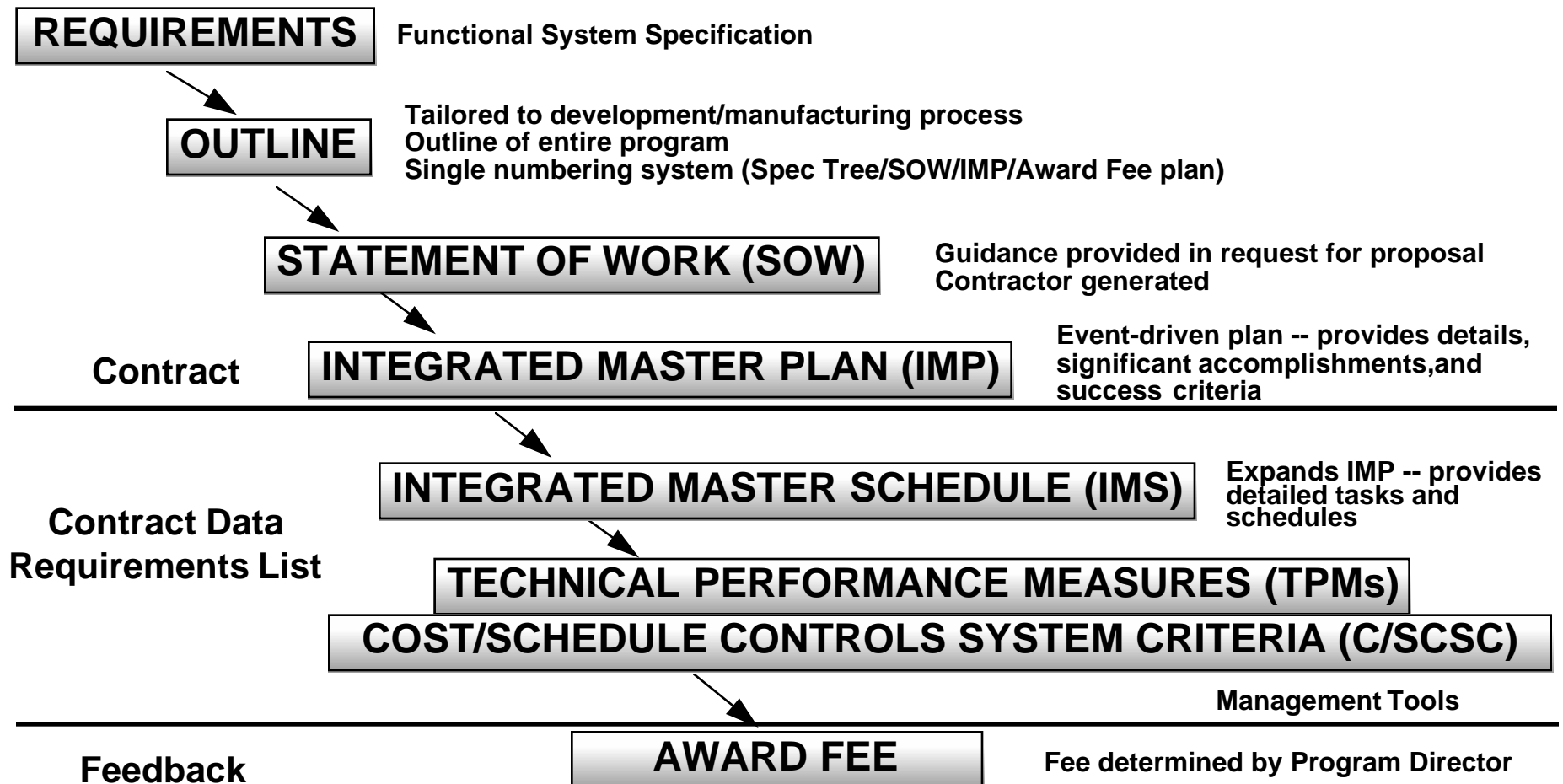
Result: An Integrated Product Team



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Integrated Management Structure

Objective: Contractor plans/commits to executable program; contractor manages to his plan; government evaluates and rewards performance

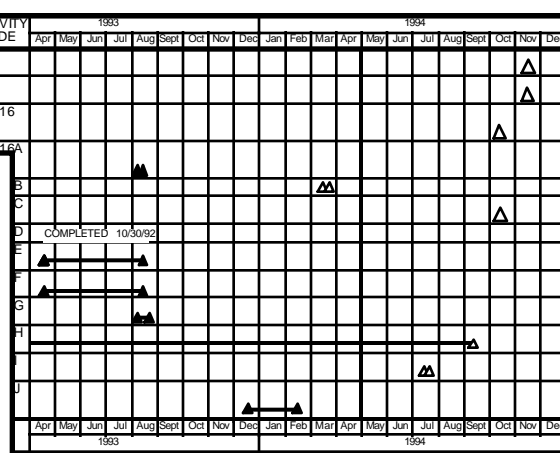
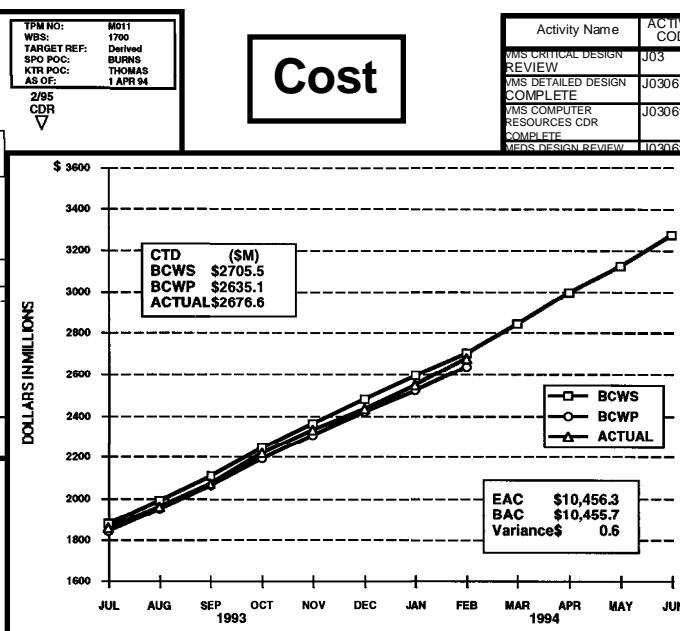
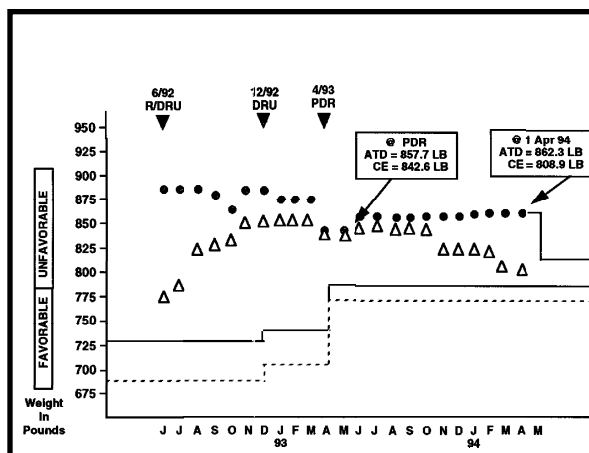


Implementation Metrics

Performance

Schedule

Cost



Technical Performance Measures (TPM) System

Integrated Master Plan & Integrated Master Schedule (IMP/IMS)

Cost/Schedule Control System (C/SCS)

Common toolset across F-22 Government - Industry Team



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Ingredients of an Effective IPT

- One - One mapping of organizational structure across Gov't - Industry team
- Common vision/focus on total weapon system
- Promote and practice CAESAR style management

Challenge•

Accountability

Empower

Support

And

Reward

- Acceptance by the team that virtually all decisions represent a balance/compromise, not

Best Performance

Lowest Cost

Most Supportable

Lasts Forever

- Open communication lines across team

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F-22 Lessons Learned

- **IPT philosophy takes leadership commitment from the top**
- **Need to constantly work at improving team communication/integration**
 - **The “I” in IPT is integrated, not independent**
 - **Vertical and horizontal integration is critical**
 - **Business (Finance/Contracts) needs to be closely integrated**
- **Functionals must clearly understand their roles and responsibilities**
 - **Meddling is not in vogue!**
- **Best to involve all stakeholders who have a interest in the outcome**
 - **SPO, contractors, suppliers, User, DPRO, and OSD**
- **Training to function as a team is paramount**
 - **Empowerment doesn’t mean independence**

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F-22 Lessons Learned (cont)

- **IPT managers must have authority over personnel and budget resources**
- **An integrated network of communications / software tools is mandatory**
- **IPT goals and objectives must be established and tracked!**
 - **Ensure all team members participate in decisions**
 - **Develop meaningful team metrics**
- **Put the right people in the right job at the right time**
 - **Appoint and train “leaders”**
 - **Replace “leaders” that don’t/can’t lead**
- **There is no substitute for open dialog**
 - **Communicate, communicate, communicate!**

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Visible Benefits to the F-22 Program

- Improved design maturity
 - Identified and resolved numerous technical problems
 - High fidelity design earlier in development
 - Configuration represents balance between performance, cost, and RM&S
- User involvement in design solution
 - All participants understand the issues
 - Enhanced customer (user) satisfaction
 - Lead the charge in making cost - requirement trades
- Improved management flexibility
 - Identify problems earlier
 - Get faster agreement on solutions
 - Better response time to contingencies

Improved understanding and cooperation across Team

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Summary

- **F-22 program management is convinced that the process works - results are real and visible**
- **Management, organization, and contract structure are breaking new ground in weapon system acquisition**
 - **IPTs are organized along product lines**
- **IPTs are a way of life for the program after 4 years of operation**
- **Each situation (program/phase) requires its own unique solution**
 - **F-22 was fortunate in having the opportunity to implement IPTs from the start**

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